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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/784,487

02/23/2004

Vincent C. Moyer

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02/16/2006

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EXAMINER

DUONG, KHANH B

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 02/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

JK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/784,487	MOYER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Khanh B. Duong	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 17-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-20 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-11 and 21-24 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/23/04</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

Applicant's election without traverse of Group I (claims 1-11 and 17-24) in the reply filed on October 28, 2005 is acknowledged.

In addition, non-elected claims 12-16 were canceled.

Thus, claims 1-11 and 17-24 remain pending.

***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on February 23, 2004 is being considered by the examiner.

***Drawings***

The drawings (FIG. 11) are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "54" has been used to designate both wire bond of sensor die 44 and wire bond of light source 46. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

Claims 6 and 7 are objected to because of the following informalities: claim 6, line 2, and claim 7, line 1, before “substrate”, “one-piece” should be --single-piece-- for constancy.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 6-8, 21 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (JP 360035244 A).**

Re claim 1, Nakamura et al. (“Nakamura”) discloses in figures 3(A) to 4(C) a method of forming an integrated circuit package having a sensor (light detector) 13 with imaging capability [see English abstract] comprising: connecting components to a single-piece substrate (lead frame) 11, including fixing an integrated circuit die to a first area 11c’ of said single-piece substrate 11 and fixing a light source 12 to a second area 11a’ of said single piece substrate 11, said integrated circuit die having said sensor 13; and enclosing said components (using resin 18) to define said integrated circuit package having exposed input/output connections (11a and 11c) and having a window 16a optically aligned with said sensor 13; wherein said first and second areas (11c’ and 11a’) of said single-piece substrate 11 are at an angle to each other within said integrated circuit package, such that an axis of light 17 from said light source 12 is non-parallel

to an imaging axis 17' of said sensor 13 and such that said light source 12 illuminates a field of view of said sensor 13.

Re claim 2, Nakamura discloses said single-piece substrate 11 is a lead frame, said fixing of said integrated circuit die including using die attach techniques [see English abstract].

Re claim 3, Nakamura discloses connecting said components includes attaching said integrated circuit die and said Light source 12 to said Lead frame 11 while said Lead frame 11 is substantially flat [see figures 3(A) and 4(A)], said enclosing including bending said lead frame 11 to establish said angle of said first area 11c' to said second area 11a' [see figures 3(B) and 4(B)].

Re claim 6, Nakamura discloses patterning electrically insulative material 14 onto opposite sides of said single-piece substrate 11 to define a package form in which said first and second areas (11a' and 11c') of said single-piece substrate 11 are fixed at said angle [see figures 3(A) to 4(C)].

Re claim 7, Nakamura discloses said single-piece substrate 11 is a Lead frame, said patterning including enabling input/output connections (11a and 11c) to remain exposed at an exterior of said package form [see figures 3(B) and 4(B) and English abstract].

Re claim 8, Nakamura expressly discloses in figures 3(A) and 4(A) connecting said components includes using die attach techniques to connect said integrated circuit die and Light source 12 from separate passes of said lead frame 11 through a fabrication line.

Re claim 21, Nakamura discloses in figures 3(A) to 4(C) a method of forming an integrated circuit package [see English abstract] comprising: fabricating a lead frame 11 having a plurality of input/output conductors (11a', 11b', 11c' and 11d'), said lead frame 11 having

spaced apart first and second areas (11c' and 11a') for receiving components; forming a package body of electrically insulative material 14 on said lead frame 11 such that said first and second areas are at a selected angle with respect to each other; fixing a sensor die 13 to said first area 11c', including electrically connecting said sensor die 13 to at least some of said input/output conductors; and fixing a Light source 12 to said second area 11a', including connecting said light source 12 to at least one of said sensor die 13 and said input/output conductors; wherein said selected angle is such that a condition is established in which Light from said light source 12 illuminates a field of view of said sensor die 13.

Re claim 23, Nakamura expressly discloses in figures 3(B), 3(C), 4(B) and 4(C) attaching a lid 18 to said package body, said lid including a lens system (15 and 16) for directing said Light from said Light source 12 and collecting Light for said sensor die 13, wherein attachment of said lid 18 forms a module for connection within an electronic device.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 9-11, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura in view of Yang et al. (US 2003/0112220 A1).**

Re claims 9-11, Nakamura expressly discloses in figures 3(B), 3(C), 4(B) and 4(C) attaching a lens system (15 and 16) for directing light from a light source 12 and for collecting light reflected from a surface, thereby providing a module for electrical and mechanical connection within an electronic device. However, Nakamura fails to disclose providing a sensor die having a matrix of pixel elements and a digital signal processing circuitry dedicated to determining navigation information on the basis of image information from said matrix.

Yang teaches in Figs. 5 and 6 providing a sensor die 14 having a matrix of pixel elements and a digital signal processing circuitry 15 dedicated to determining navigation information on the basis of image information from said matrix [see page 7, paragraphs 0091 to 0095].

Since Nakamura and Yang are from the same field of endeavor, the purpose disclosed by Yang would have been recognized in the pertinent prior art of Nakamura.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method disclosed by Nakamura as taught by Yang, since Yang states at paragraph 0094 that such modification would enable the mouse device to recognize the moving direction and distance of the mouse device in accordance with the movement thereof.

Re claims 22 and 24, see discussion above regarding claims 9-11. In addition, Nakamura expressly discloses in figs. 3(A) and 4(A) fixing said sensor die 13 includes using die attach and wire bonding techniques.

#### ***Allowable Subject Matter***

Claims 4 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 17-20 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: none of the prior art of record, taken alone or in combination, fairly discloses the following limitations in combination with the rest of the limitations in the claim: bending said lead frame in a region between said first and second areas to establish a condition in which light from said light source illuminates a field of view of said sensor die.

#### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Son '117, Kato '387 and Fong '371 teach relevant methods for forming optical mouse.



Art Unit: 2822

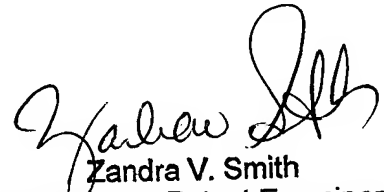
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



Zandra V. Smith  
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2/6/2006